

## STATUS AND CONSERVATION OF THE WILD BUFFALO *BUBALUS BUBALIS* IN PENINSULAR INDIA<sup>1</sup>

M.K. RANJITSINH<sup>2</sup>, S.C. VERMA<sup>3</sup>, S.A. AKHTAR<sup>4</sup>, VINOD PATIL<sup>4</sup>, K. SIVAKUMAR<sup>5</sup>, S. BHANUBHAKUDE<sup>5</sup>

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<sup>2</sup>'Krishnasar', 5, Tiger Lane, Off W6 Lane, Sainik Farms, Near Saket, Delhi 110 062, India.

<sup>3</sup>Bastar Society for Conservation of Nature, 'Jeevan Sadan', Nayapara, Jagdalpur 494 001, Chhattisgarh, India.

<sup>4</sup>Bombay Natural History Society, Hornbill House, S.B. Singh Road, Mumbai 400 023, Maharashtra, India.

Email: bnhs@bom4.vsnl.net.in

<sup>5</sup>Wildlife Institute of India, P.O. Box 18, Chandrabani, Dehra Dun 248 001, Uttaranchal, India.

Most of the Wild Buffalo *Bubalus bubalis* populations in India have been genetically swamped out through inter-breeding with domestic populations. However, genetically pure species of the Wild Buffalo confined in the four protected areas especially set up for them in Peninsular India, for the last two decades, are their main hope. The population of the endangered Asiatic Wild Buffalo in Central India is restricted to two protected areas and their numbers are less than 75. The major reasons for the decline of Wild Buffalo population in peninsular India are agricultural encroachments, poaching, cattle grazing, insurgency and collection of non-timber forest produce. The population is under severe threat due to depletion of suitable swamp grassland habitat, large-scale poaching and communal hunting. Management interventions for long-term conservation of the Wild Buffalo were inadequate. Some suggestions are provided to improve the effectiveness of the conservation efforts in peninsular India to protect the existing populations of this species in the Indravati National Park and Tiger Reserve, and Udanti Wildlife Sanctuary.

**Key words:** Wild Buffalo, *Bubalus bubalis*, conservation, Udanti Sanctuary, Indravati National Park and Tiger Reserve

### INTRODUCTION

The Wild Buffalo *Bubalus bubalis* is one of the largest and highly endangered land mammals in the Subcontinent. In the last bastion of the Wild Buffalo, Assam, the population is now almost confined to four protected areas. In Dibru-Saikhowa and Pabha Sanctuaries, the few surviving animals are affected by genetic "swamping out" through inter-breeding with the domestic buffalo; the population in Kaziranga has also been affected. There is a marked deterioration in size of the Wild Buffalo here in the last four decades, further confirmed by the markedly less pronounced occurrence of the characteristics which distinguish the wild from the domestic (Ranjitsinh 1997). In Manas, the laxity of control due to terrorist incursions in the past decade has resulted both in the reduction of numbers and in genetic swamping out in the much more numerous southern population, which will inevitably have an effect upon the rest of the herds in the adjacent central part of the Reserve — the Uchila Range and along the Manas-Beki River.

The main hope for genetically pure Wild Buffalo, therefore, lies in the peninsular population that has been confined for the last two decades in the four protected areas especially set up for them in Chhattisgarh — Udanti Sanctuary, Bhairamgarh Sanctuary, Pamed Sanctuary and the Indravati National Park and Tiger Reserve.

Genetic swamping out has not occurred here for various reasons — vast, very thinly populated malaria — infected forests, where tribals traditionally did not keep domestic buffaloes for fear of the female buffaloes being commandeered away and the domestic bulls killed by wild ones. Due to the great difference in size between the domestic and the wild, in cases where inter-breeding did occur in this area, it resulted almost invariably in the death of the mother or the calf, or both, at the time of birth. In Assam, the difference between the domestic and the wild buffalo is much less pronounced and progressively so with the initiation of genetic swamping. There are more domestic buffaloes than any other livestock species in the world. Their most common use is, significantly not as milch cattle, but as draught animals where size and strength are most important. Thus, the degeneration, let alone disappearance, of the wild buffalo through genetic swamping should be of particular concern, the animal being the most important large wild mammal in the world today, and vis-à-vis human welfare, an invaluable gene pool.

Earlier surveys (Mooney 1930, Daniel and Grubh 1966, Divekar 1976, Divekar *et al.* 1979, Divekar and Bhushan 1988) concentrated on the status and ecology of the species. Other studies focussed on the morphological features and behavioural characteristics of the species (Gee 1953, Inverarity 1895, Lall 1953, Noronha 1954a, b). The study of Daniel and Grubh

resulted in the species being declared endangered and it was placed on the IUCN Red Data Book (1982). Even during the earlier surveys, the population of about 200 to 250 animals in 640 sq. km of the best buffalo habitat was considered to be low (Daniel and Grubh 1966). Considering the rate of habitat degradation in peninsular India and the time of last survey, which took place a decade back, a survey to assess the current status of Wild Buffalo and its habitat was realized and initiated.

## STUDY AREA

### Udanti Sanctuary

Udanti Sanctuary is situated in the Raipur district of Chhattisgarh State of India. The habitat of the Sanctuary is representative of mixed dry deciduous forest (Champion and Seth 1968). Some important woody plants are *Shorea robusta*, *Diospyros melanoxylon*, *Buchanania lanzan*, *Terminalia tomentosa*, *Anogeissus latifolia*, *Stereospermum suaveolens*, *Pterocarpus marsupium*, *Cassia fistula*, *Ougeinia oojeinensis*, *Madhuca indica*, etc. Almost the entire ground is covered with grasses. *Heteropogon contortus*, *Imperata cylindrica*, *Bothriochloa odorata*, *B. pertusa*, *Dichanthium annulatum*, and *Themeda quadrivalvis* are the major grass species, which are disturbed by humans as well as overgrazed by domestic cattle. The Sanctuary is mostly flat, but the northern part is hilly. The main drainage system is the Udanti river and its tributaries. The Udanti river is not perennial, but small pools always retain water even in summer. Soil in this region is generally loamy and well drained. Gonds, Bujjia and Umar are the major tribes living in these areas.

### Indravati National Park and Tiger Reserve

The Indravati National Park is situated in the districts of Bastar and Dantewada of Chhattisgarh State. The habitat of the Park is mixed deciduous forest interspersed with various open pockets of abandoned arable land (Champion and Seth 1968). Some important woody plants are *Diospyros melanoxylon*, *Buchanania lanzan*, *Tectona grandis*, *Terminalia tomentosa*, *Anogeissus latifolia*, *Stereospermum suaveolens*, *Pterocarpus marsupium*, *Cassia fistula*, *Ougeinia oojeinensis*, *Cleistanthus collinus*, and *Gmelina arborea*. Hill slopes and riverbanks are covered with bamboo *Dendrocalamus strictus*. However, the vegetation varies from place to place (Pandey 1988). Most of the grasslands, which are the result of abandoned arable lands and accumulation of water in shallow 'troughs' in the monsoon, are the ideal

habitats for wild animals. Due to prevailing successional stages, these patches are being encroached on by woody plants as a result of compaction of soil due to repeated fires and trampling by livestock. There was no appreciable growth of *Ficus* sp., which might be due to edaphic factors. The dominant grass species are *Heteropogon contortus*, *Imperata cylindrica*, *Bothriochloa odorata*, *B. pertusa*, *Dichanthium annulatum*, *Themeda quadrivalvis*, *T. triandra*, *Eragrostis* spp., *Chrysopogon fulvus*, and *Vetiveria zizanioides*. Wild Buffalo preferred *Cyperus corymbosus*, *Cynodon dactylon*, *Themeda quadrivalvis*, and *Coix* spp., among others.

In both the protected areas, as in the rest of India, there are three distinct seasons. The temperature, humidity and precipitation vary so greatly that they regulate the growth of vegetation and also the habits of the wild animals. Rain commences by the second week of June and continues till September. The average rainfall was 182 cm. The highest temperature (45 °C) was recorded in May 1973 and the minimum (2.8 °C) was recorded in January 1945 at Jagdalpur. Humidity is between 22% and 87%. Wind velocity is maximum in July and minimum in January. During the survey period, the maximum temperature was about 43 °C.

## METHODS

### Udanti Sanctuary

Udanti Sanctuary was surveyed from May 10-13, 2000. The survey was carried out in all the forest compartments (water pools and forest roads) where wild buffaloes were reported earlier. A 100 x 1000 m (10 hectare) transect was laid for estimating the Wild Buffalo population by looking for dung density as well as hoof marks. To avoid confusion while differentiating hoof marks, the size (length and width) of the hoof marks of both wild and domestic buffaloes were measured after sighting the animal directly. Any hoof marks larger than 14 x 13 cm were considered as that of the Wild Buffalo.

### Indravati National Park and Tiger Reserve

The Indravati National Park and Tiger Reserve was surveyed from May 14-17, 2000. The survey commenced from Bijapur and ended at the same place via Somanpalli, Pharsegarh (night halt); Pilur, Jalavagu, Sopmarka, Badekakler, Chhotekakler, Arepalli, Sendra, Mattimarka (on the Indravati River and a halt on an island); Sendra, Pengunda (night halt); Netikakler, Karkawada, Godnugur, Durepalli and Kutru. During the survey, we checked most of the artificial water pools, visited the areas where Wild Buffalo were sighted earlier and had discussions with the people of the area.

## RESULTS AND DISCUSSION

In the two protected areas, Udanti Sanctuary and Indravati National Park and Tiger Reserve, where the wild buffalo still survives, this survey was able to assess about 42-44 buffaloes in Udanti and 25-30 buffaloes in Indravati, the total number being less than 75. In the Indravati National Park, the population is split into three disparate clusters, with possibly little or no inter-breeding, giving rise to a spectre of severe inbreeding amongst the three separate clusters. These three clusters are:

1. **The Salepalli – Pillur cluster:** Comprising a solitary bull and a herd of five to six animals. This is in the southeastern part of the Park.

2. **The Tekmetta cluster:** Comprising a solitary bull and a herd of five to six animals. This is in the southwestern part of the National Park, which is the remotest and least disturbed part of the Park. It is comprised of hills and valleys adjoining the eastern flank of the Indravati, providing the most disturbance free habitat with the most readily available access to perennial water — the Indravati. Significantly, however, the hilly terrain is not a particularly suitable habitat for the buffalo. Here, we assessed the presence of 10-15 animals in three or four groups as well as solitary individuals. This area, which is the site of the proposed Bhopalpatnam dam, holds the best hope for the survival of the Wild Buffalo in the Indravati National Park.

3. **The Pengunda – Netikakler cluster:** Comprising nine animals; one solitary, a herd comprising of a bull, two adult cows, a sub-adult and calf, and another group of a cow, sub-adult and calf. This cluster is in the northeastern part of the Park.

The extent of persecution of the buffalo was evident from the behaviour pattern of the animals. Wild Buffaloes are highly averse to human disturbance and have sought refuge in the remotest habitats, the solitary bulls that seek domestic buffalo for mating being an exception. In both Indravati and Udanti, wild buffaloes have become entirely nocturnal from their normal diurnal habits. They seek the remotest forests for daytime resting, travelling long distances from their feeding ground. What is more, they appear to have forsaken their usual midday immersion in water and a drink of water, even during the height of summer. Even at night, they now avoid artificial tanks, such as the Modakvaya near Pengunda, frequented by livestock and fishermen, preferring to skirt the tank to walk six or more kilometres each way each night in summer, to reach the safe and quieter Indravati river and then back to their feeding grounds. The survey team could see only one solitary bull, of the Tekmetta cluster, at 0430 hrs after waiting

the whole night on an island in the Indravati. It had come for an early morning drink before lying up for the day. Fresh footprints of all the three clusters of buffaloes were seen.

In Udanti Sanctuary, the Wild Buffalo population is now restricted to a very small area of 80 sq. km, possibly because of the persistent habitat disturbances. In all, seven Wild Buffaloes were sighted between 1800 and 1900 hrs on May 12, 2000 and the next day. Of these, one was a solitary bull and others were in a herd, comprising two adult females, one adult male, two yearlings and a calf about one month old. Seven more Wild Buffaloes were also identified on the basis of hoof marks near the water pools and the transect area. Since domestic buffaloes were present throughout the Sanctuary, there were limitations to differentiating the hoof marks between wild and domestic buffalo. All the water pools had old and dried (hardened) hoof marks of both domestic and wild buffalo. Transect counts confirmed the presence of at least two herds of Wild Buffaloes based on hoof mark tracing and dung cakes (wild buffalo having larger dung cakes). Four fresh and 19 old dung cakes were observed in the 10 hectare transect area. However, small sized dung deposits provided confusing results, as young ones of Wild Buffaloes may have deposited the smaller dung cakes. Dung and hoof mark counting may be a good method for estimating the status of Wild Buffaloes if the area is devoid of domestic buffaloes. The team could hardly come to a definite conclusion on the population size.

Secondly, information collected from the local and forest field staff revealed that the number of Wild Buffaloes range between 42 and 44. Demography of known herds shows that there was good recruitment in this population.

The normal behaviour of the wild buffalo in this sanctuary has changed. A herd arrived at the pond for drinking water at 1805 hrs in the Nagesh Tank. They spent around 50 minutes in the pond area. During this period, they browsed in the nearby grassy patches and wallowed in the pond. The one month old calf always remained near its mother. The entire herd remained together and some of the members were vigilant and constantly looked around. The herd was alert and under stress throughout the observation period and this can most probably be attributed to human disturbance. A huge solitary bull sighted by the team was standing under a *Diospyros melanoxylon* tree at 1855 hrs and staring at the team's vehicle, though it made no move. A few minutes earlier, it had caused a forest guard to seek safety up a tree, from where he was rescued by the survey team.

## People

Of the 80 families living in Karrajhar and Nagesh villages in Udanti, approximately 50 people participated in the discussion with us. Gonds, Bhujjia and Kamar are the major tribes living in these villages. Generally, these people are farmers raising kharif crops and they keep a large number of cattle, which are reportedly unproductive. During the summer season, they are engaged in non-timber forest produce (NTFP) collection, mainly tendu *Diospyros melanoxylon* leaves and also earn income through road construction, deepening of village ponds, as forest firewatchers. They revealed that there are no good schools, transport or medical facilities near by. Although they showed keen interest in the conservation of the wild buffalo, they complained that the occasional raid of their crops by wild buffaloes, especially kulthi and madaia, two locally grown pulses, affected them. They realised that the population of the wild buffalo is decreasing. However, they were unable or unwilling to give reasons for this decline.

Indravati National Park holds resident populations of three tribal groups, namely Gonds, Marias and Murias. They generally depend on monsoon-based sustenance agriculture and plant kharif crops, besides keeping a large number of livestock including some buffaloes. They are also hunters, and hunt almost all the wild vertebrates using nets, traps and indigenous weapons, such as axe, spear, bow and arrow. We noticed unrestricted movement of the people inside the protected areas (PAs) armed with bows and arrows. They also perform communal hunting (*Paradh*) when people from one or more villages get together and flush out all the wild animals towards a long chain of nets raised on bamboo poles. Forest officials and the survey team stopped one such big *Paradh* while returning from Karkawada to Kerpe on May 17, 2000. The team seized seven nets (a net = 2 x 10 m in size) and bamboo poles, axe and spear from the hunters. Approximately 40 people, including some young boys, were involved in the *Paradh*. During the summer, apart from hunting, the local people are engaged in collection of Non Timber Forest Produce (NTFP), mainly tendu *Diospyros melanoxylon* and mahuwa *Madhuca indica*. Although the income from this is estimated to be less than Rs. 200/capita/annum, the disturbance and damage caused has adverse effects on the entire tract of the protected area (PA). Unavailability of work and unrestricted movement inside PAs during summer has led the people to engage in large scale hunting. The negative perception about conservation of wild buffalo and other wildlife is due to possible attack from these animals. In the past, there were incidents of conflict between humans and the wild buffalo. On May 2, 2000,

a solitary wild buffalo bull killed one person near Phulgundam village.

## Availability of Water

In Udanti Sanctuary, water is retained in a few pools in the Udanti river in summer. There are four artificial tanks spaced out in the main Wild Buffalo habitat, which also retain water in summer. However, the presence of domestic buffaloes and other livestock deters the Wild Buffalo and other animals from utilizing almost all the water sources barring two, during daylight.

Indravati National Park and Tiger Reserve is a high rainfall area. However, the soil being porous sandy loam its water retention capacity is low. In the past, depressions and troughs in the soil enabled accumulation of shallow water and growth of marshy grasslands suitable for animals like the Wild Buffalo and the Barasingha. Incessant fires have not only destroyed the grass, especially the more palatable perennial *Andropogon* varieties, but also led to the hardening of the soil, which is further compacted by the hoof marks of livestock attracted by the flush of grass following the burning. Gradually, the marshy grasslands have become hard ground covered by short, annual, less nutritious *Heteropogon* grasses, gradually being overtaken by tree growth.

What was indeed most surprising was the lack of perennial water. The Indravati river, circumscribing as it does a loop covering two sides of the Protected Area, is the only natural perennial water source. In the rest of the vast area, there are a few artificial tanks and a few pools in the Davil Vagu and Kaker river, all occupied by livestock in summer. Even in the Pillur tank, there were no recent Wild Buffalo hoof prints to be seen. The lack of water during the peak of summer is a major drawback for wildlife in the Indravati National Park. It also facilitates ambush at water holes and *Paradh* operations.

## Threats and Recommendations

The following adverse factors and threats were observed and perceived:

1. Communal hunting called *Paradh* is universally practised throughout Indravati National Park, persistently and methodically in the dry season. No animal is safe from this operation.

2. Fire, mostly repeated fires, were seen to have affected about 95% of the National Park. This deliberate burning is for *Paradh*, collection of the NTFP, especially tendu leaves and for grazing purposes.

3. Extensive grazing and related fires, and disturbance, habitat degradation and threat of contagion of livestock-borne diseases. However, the livestock population in itself is not high and there are few domestic buffaloes even now.

4. Extensive and continuous anthropogenic disturbance.

5. Existence of 53 villages, though small in population, spread all over in a jig-saw puzzle formation, have an overall adverse impact. Almost all are revenue villages.

6. Lack of adequate number of permanent waterbodies. Barring the Indravati, all existing water points pose a danger to wild animals in summer.

7. Presence of Naxalites. Though these groups are largely pro-forest and pro-wildlife, their occurrence in the Indravati Tiger Reserve is both the reason and an excuse for many failings in management. Wireless sets have been snatched in 1988, government buildings destroyed, culverts and roads not allowed to be built and the Field Director attacked.

8. Routine patrolling and law enforcement is thus greatly hampered and a fear psychosis affects the staff.

9. Lack of adequate and appropriate manpower and infrastructure support, resulting in failings in management.

### Conservation measures

1. Final notification of the Indravati National Park and Tiger Reserve must take place immediately. It has been proposed to extend the National Park over uninhabited forests southeast towards Bijapur. Those portions of the Indravati National Park which are Reserved Forests, together with the Reserved Forest portions of the proposed extension mentioned above, can forthwith be declared a national park as no acquisition of rights proceedings are required.

2. NTFP collection for non-commercial use only should be continued, as per the management plan, in the sanctuary portion only. All NTFP collection for commercial purpose must stop forthwith in these PAs.

3. An updated management plan has to be prepared for the Indravati Tiger Reserve and the Udanti-Sitanadi Protected Areas complex.

4. In view of the severe pressures being inflicted upon the surviving Wild Buffalo in Indravati National Park, the Udanti-Sitanadi population assumes additional importance. A 'corridor' linking Udanti and Sitanadi Sanctuaries has long been proposed. This must be established in the form of a sanctuary extension and the Udanti-Sitanadi Complex together with the 'corridor' be managed as one ecological entity.

5. The Reserved Forests of Udanti south of the Raipur-Deobhog Road and at least the adjacent reserved forest of the eastern parts of the Sitanadi Sanctuary which have no habitations, together with the uninhabited Reserved Forests of the proposed corridor, should become a national park, and the rest finally declared as

a sanctuary.

6. Fire application and long lines of strong, high nets during *Paradh* must stop. While the authorities must show determination to stop this at any cost, persuasion and alternatives should also be proffered. The pujaris of various villages should be persuaded to change over to symbolic *Paradhs* in the form of a ritual and the meat requirements, in the form of live buffaloes and goats, could be provided by the Park authorities. It is certainly worth attempting.

7. The Wild Buffalo needs large tracts of undisturbed forests with grassy openings, preferably moist and marshy patches, and close proximity of perennial water. This must be ensured in all management applications and the disturbance factor must not be ignored.

8. Currently, the 19 km stretch of the Indravati river extending from below Bendrai Gutta hill to above Mattimarka village, constituting the border between Maharashtra and Chhattisgarh, happens to be the most remote and uninhabited stretch of a river anywhere in Chhattisgarh and there are no habitations in the adjacent forests which comprise of the Kutru Reserved Forest. This tract with its frontage on the Indravati is the most promising habitat where a last ditch effort can be made, as the focal point of protection efforts and inputs, including constant monitoring. This area affords perhaps the last hope of saving the peninsular Wild Buffalo.

9. The 53 existing villages within the Indravati National Park and others in the buffer area are encroaching upon forests and expanding their cultivation illegally. These encroachers must be evicted.

10. In view of the grave danger of extinction as well as genetic degeneration through interbreeding with domestic buffaloes, the peninsular buffalo may be the only hope for the survival of the pure strain of Wild Buffalo. A special project should be started jointly by the Central Government and the State Governments of Chhattisgarh and Maharashtra, to define and implement immediate and long-term actions. A special fund would have to be provided by the Central Government, but the infrastructural, logistical and other support and inputs would have to come from the two States. Subsequently, if the buffalo numbers increase and some movement of wild buffaloes to Orissa and Andhra Pradesh occurs, these States should also be involved.

11. The buffaloes in Indravati National Park are in three distinct clusters, as mentioned. Three small protection units or special parties need to be established, each under a selected forester or deputy ranger and comprising of local persons of knowledge and commitment, whose sole job would be to save these three clusters of wild buffalo and their habitat from

poaching, harassment and fire. They would continuously monitor the movements of the animals and would be personally responsible for their safety. The units must be adequately equipped, regularly supervised, and rewarded when successful in their work.

12. Traditionally domestic buffaloes are not kept in Wild Buffalo habitats, a trend to be encouraged and domestic buffaloes relocated outside the main buffalo habitats in the Indravati, and from Udanti in particular.

13. Paucity of water in peak summer is a serious drawback. However, the tanks that have been made have been so disturbed by man and livestock that wild buffaloes do not use many of them, Modakvaya lake being one example. These remote tanks meant for wildlife away from human habitations must be kept free of human disturbance.

14. Fire, which is deliberate, universal and repeated, must be controlled. Stoppage of *Paradh* and the commercial collection of NTFP would itself reduce the incidence of fire greatly. For the rest, incentives to the locals would have to be given annually on performance in both putting out and preventing fires.

15. Dialogue with the locals, their leaders and even the 'Naxalites' to convince them of the reasons of management actions and, to ascertain and provide the genuine basic requirements of the local people, including alternatives. Their participation in conservation action must be obtained to the extent possible, and in this endeavour NGOs like the Bastar Society for Conservation of Nature (BASCON), would be most helpful.

16. While no coercion need be done, inhabitants of the smaller and more remote of the 53 villages within the Park can be approached to ascertain whether they would wish to resettle either outside the Park, or even move over to a larger village within it. The attempt should first be made in the habitats of the three remaining clusters of wild buffaloes. Those habitations that wish to move should be given an option of where to go, given one and a half times the land that they legally possess and other compensations, and be provided vehicular transport to shift their belongings. But it may be ensured that an entire habitation is shifted, not just a few members of it, and after shifting they should not come back and take possession of their previous holdings as well. This is a very sensitive issue and should only be attempted in cooperation with the local leaders and politicians.

17. Eco-development should be taken up in the buffer area of the Park, the aim being to reduce the biotic pressure, and move away from the Park by providing alternatives.

18. An anti-poaching camp should be posted at Pharsegadh for Indravati and provided with mini-trucks.

Park staff, including forest guards, should be trained in the wildlife guard training school at Bandhavgarh.

19. Prophylactic inoculation is done sporadically in pursuance of the Supreme Court orders. This must be more regular and widespread.

20. Continuous monitoring and applied research to assist management and ensure a scientific presence, involving local universities and institutions.

21. Coordination and regular contact between the field management personnel in adjacent areas of Madhya Pradesh, Maharashtra, Orissa and Andhra Pradesh.

22. The Bhopalpatnam dam site is almost in the centre of the 19 km stretch of the Indravati. If the dam is allowed, it will mean the destruction of this magnificent habitat and of the last hope of the survival of the buffalo in the Indravati National Park and Tiger Reserve.

23. The Udanti-Sitanadi complex is under the threat of mining. This must be prevented at all cost and this complex of PAs with the corridor in between and suitable adjacent areas should now be made into a Tiger Reserve under Project Tiger.

24. As a safeguard against extinction in the wild, a capture, translocation or captive breeding/reintroduction programme may have to be contemplated, as a last resort. A suitable site would be the large enclosure in Sukhpar, Kanha National Park, which could then be a haven for the species. In any case, expertise would have to be developed within the Indravati National Park management to enable translocation, treatment and local translocation of Wild Buffalo which might have been wounded, or where it may be necessary to shift unsafe or single animals from one part of the Park to another.

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